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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR   | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|------------------------|---------------------|------------------|
| 10/074,722  | 02/11/2002  | Christophe F. Pomarede | ASMEX.320 A         | 6768             |
| 20995   | 7590        | 05/03/2004             | EXAMINER            |                  |
| KNOBBE MARTENS OLSON & BEAR LLP<br>2040 MAIN STREET<br>FOURTEENTH FLOOR<br>IRVINE, CA 92614 |             |                        | POMPEY, RON EVERETT |                  |
|   |             |                        | ART UNIT            | PAPER NUMBER     |
|   |             |                        | 2812                |                  |

DATE MAILED: 05/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                               |                                 |  |
|------------------------------|-------------------------------|---------------------------------|--|
| <b>Office Action Summary</b> | Application No.<br>10/074,722 | Applicant(s)<br>POMAREDE ET AL. |  |
|                              | Examiner<br>Ron E Pompey      | Art Unit<br>2812                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 March 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-47 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 – 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murthy et al. (US 6,373,112) in further view of Nakabayashi et al. (US 6,319,782) and Shiota et al. (US 5,879,970).

Murthy discloses the limitations of claims 1-47:

depositing a silicon-containing seed layer (106, fig. 2) over the high dielectric constant material (104, fig. 2) under seed phase conditions (col. 2, lns. 29-38); and

depositing a silicon-containing bulk layer (108, fig. 2) over the seed layer under bulk phase conditions, the bulk phase conditions selected to result in a higher deposition rate than the seed phase conditions (col. 4, ln. 41 – col. 5, ln. 9).

3. Murthy discloses the claimed limitations, as described above, except the limitations disclosed below by Nakabayashi and Shiota:

Nakabayashi discloses:

using a non-hydrogen carrier gas;

wherein silane includes higher order silane gas; and

wherein the seed phase is less than 500 Å/min and the deposition rate for of the bulk phase is greater than 500 Å/min (col. 10, ln. 44 – col. 11, ln. 31);

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Shiota discloses:

using a non-hydrogen carrier gas; and

wherein silane includes higher order silane gas (col. 1, Ins. 20-40);

Therefore one of ordinary skill would have combined the limitations disclosed in Nakabayashi and Shiota with Murthy, because the non-hydrogen carrier gases can remove/reduce unwanted oxides and that it is conventional to form silicon or silicon germanium layers whether with hydrogen or non-hydrogen carrier gases. Also, Murthy does not disclose the entire group of different high dielectric materials as claimed. However, Murthy does disclose that "other high dielectric materials....such as for example Hafnium oxides..." can be used as materials over the substrate, and because the applicants' specification does not disclose a distinctive difference between the materials listed in the group of high dielectric materials, it would have been obvious to one of ordinary skill in the art at the time of the invention to that the materials in the group of high dielectric materials claimed are encompassed in the high dielectric materials disclosed in Murthy.

### ***Response to Arguments***

4. Applicant's arguments filed 3-10-04, pertaining to claims 1-47, have been fully considered but they are not persuasive.

Applicant(s) argues that neither the Nakabayashi nor Shiota reference disclose using a non-hydrogen carrier. However in Nakabayashi (col. 10, Ins. 44-47; 51-55) discloses using Chlorine as a carrier gas, to strip away unwanted oxide that is formed on silicon oxide film (see Nakabayashi, col. 10, Ins. 52-54). This is one example that is

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shown in the Nakabayashi or Shiota references that demonstrate one of ordinary skill in the art uses non-hydrogen gases in the formation of a silicon layer.

Also, Applicant argues that because Nakabayashi does not show motivation to use disilane instead of the silane as disclosed in Murthy, because the layer forms a "nanocrystalline Si seed film". However, because claim 20 talks about depositing an electrode material which includes both the seed and bulk layer of Murthy. Therefore, Nakabayashi, discloses using either silane or disilane (col. 11, lns. 21-26) for the SiGe or bulk layer, therefore showing that one of ordinary skill in the art uses the gases interchangeably.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ron E Pompey whose telephone number is (571) 272-1680. The examiner can normally be reached on flex schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (571) 272-1679. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.


Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-

9197 (toll-free).

  
Ron Pompey

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April 30, 2004

  
John F. Niebling  
Supervisory Patent Examiner  
Technology Center 2800